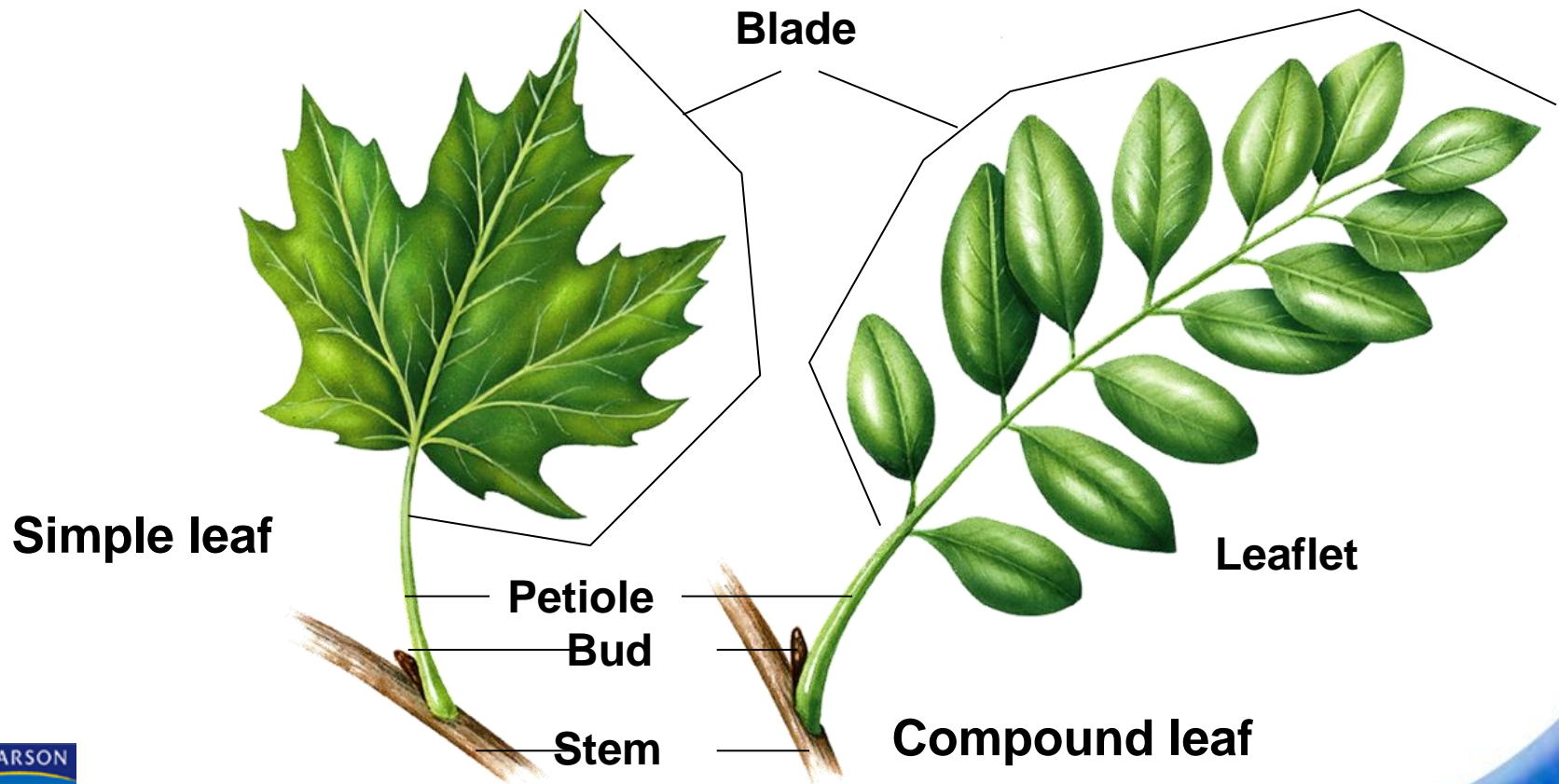


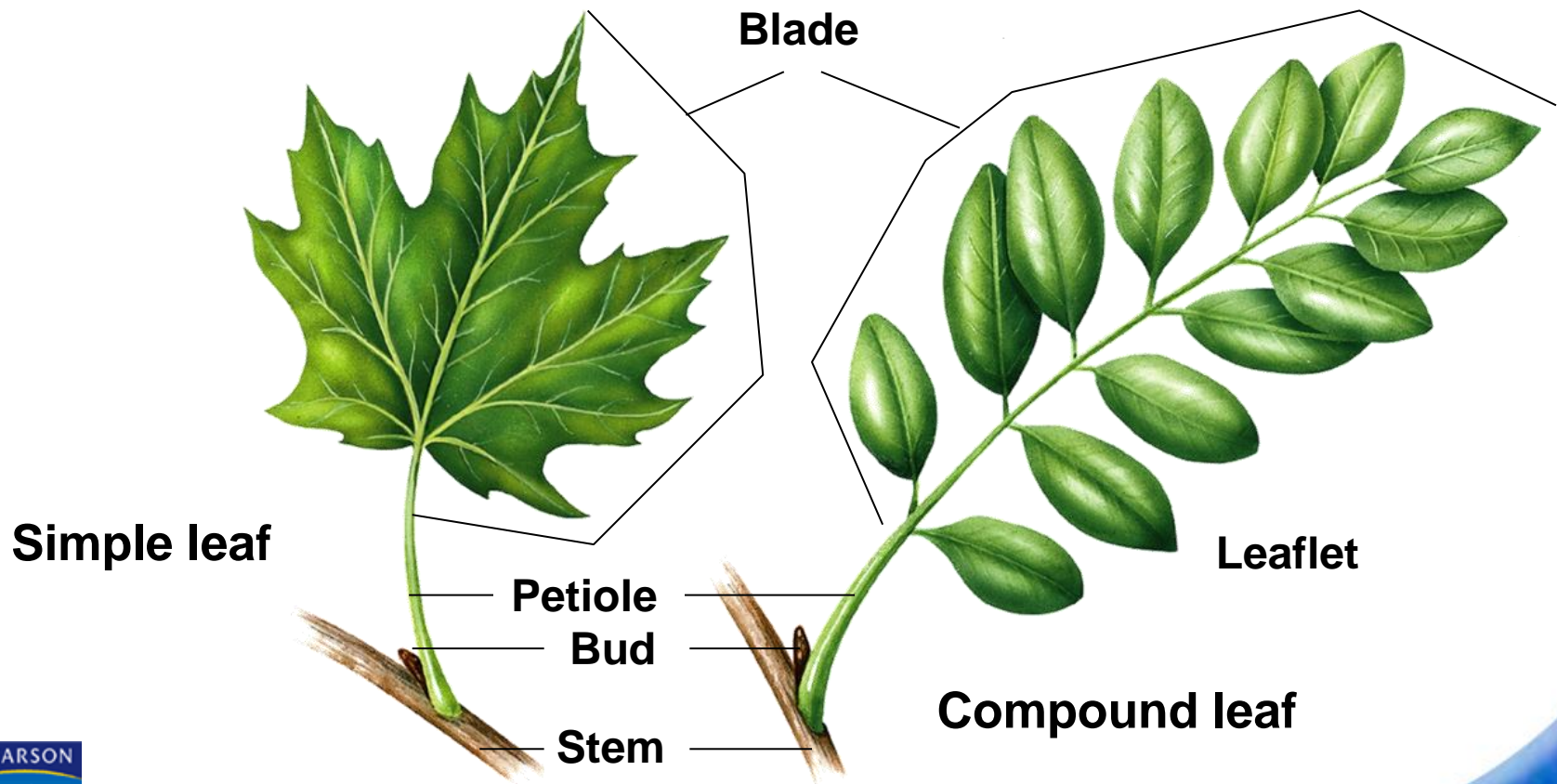
23-4 Leaves



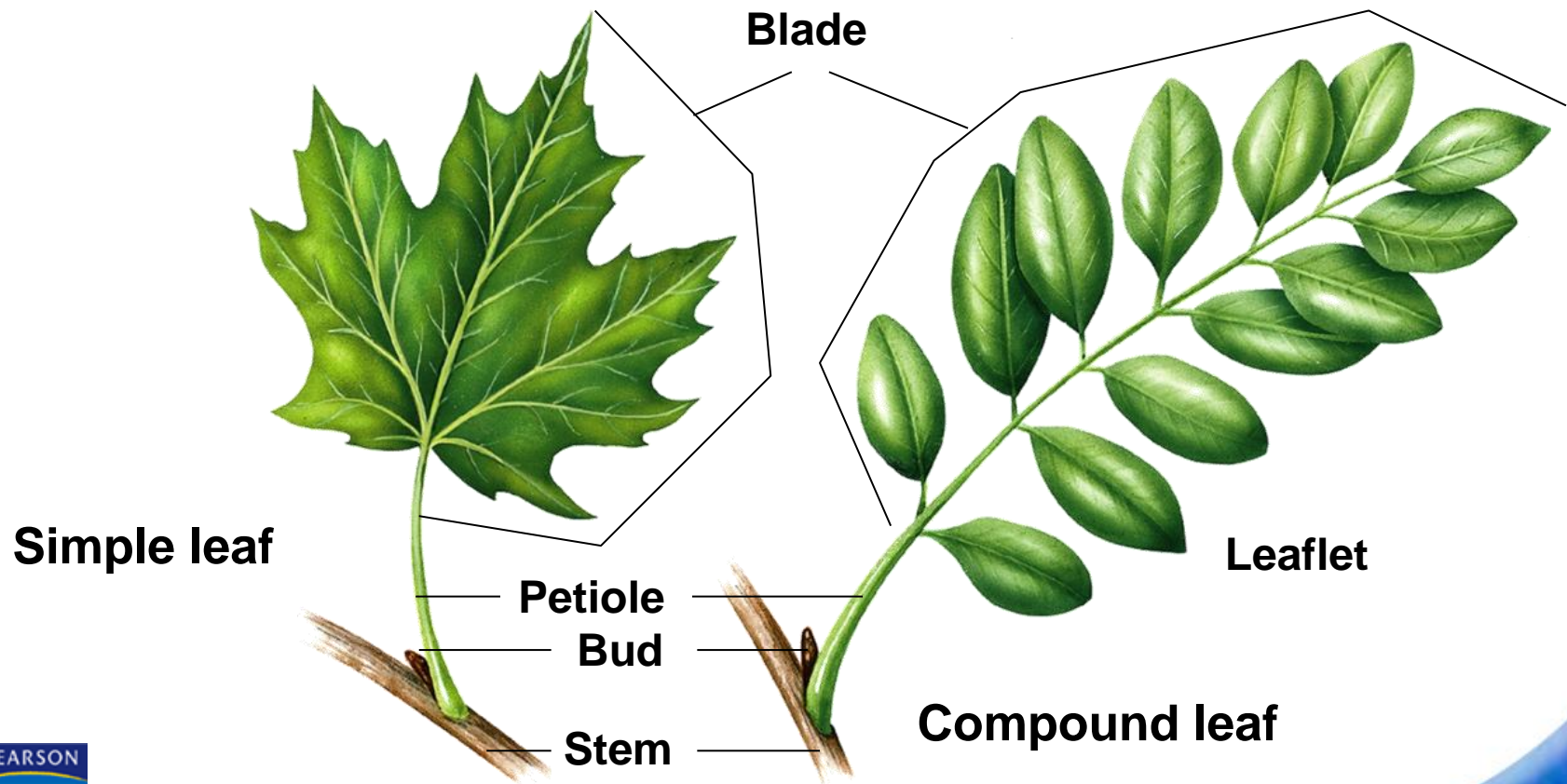
To collect sunlight, most leaves have thin, flattened sections called **blades**.



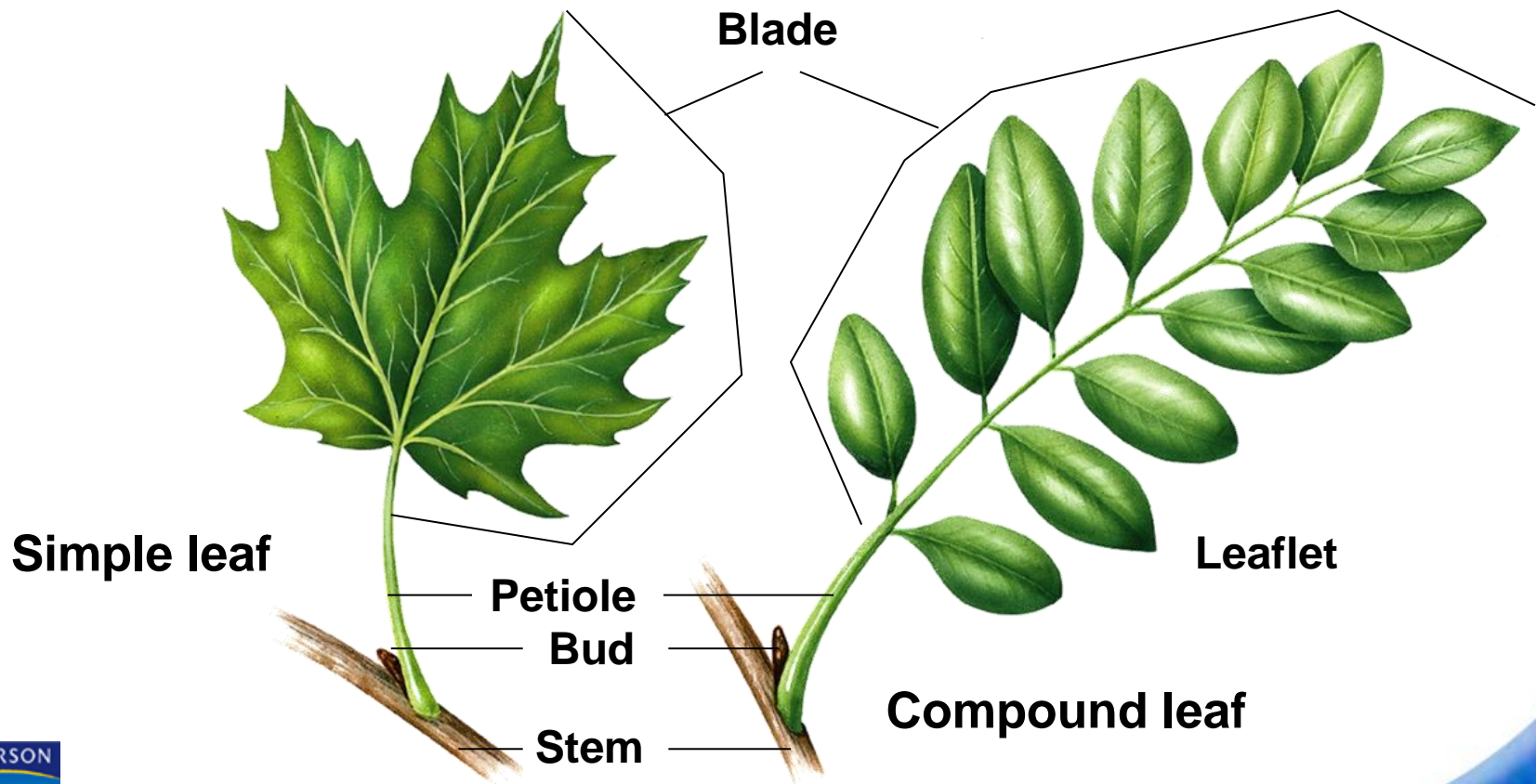
The blade is attached to the stem by a thin stalk called a **petiole**.



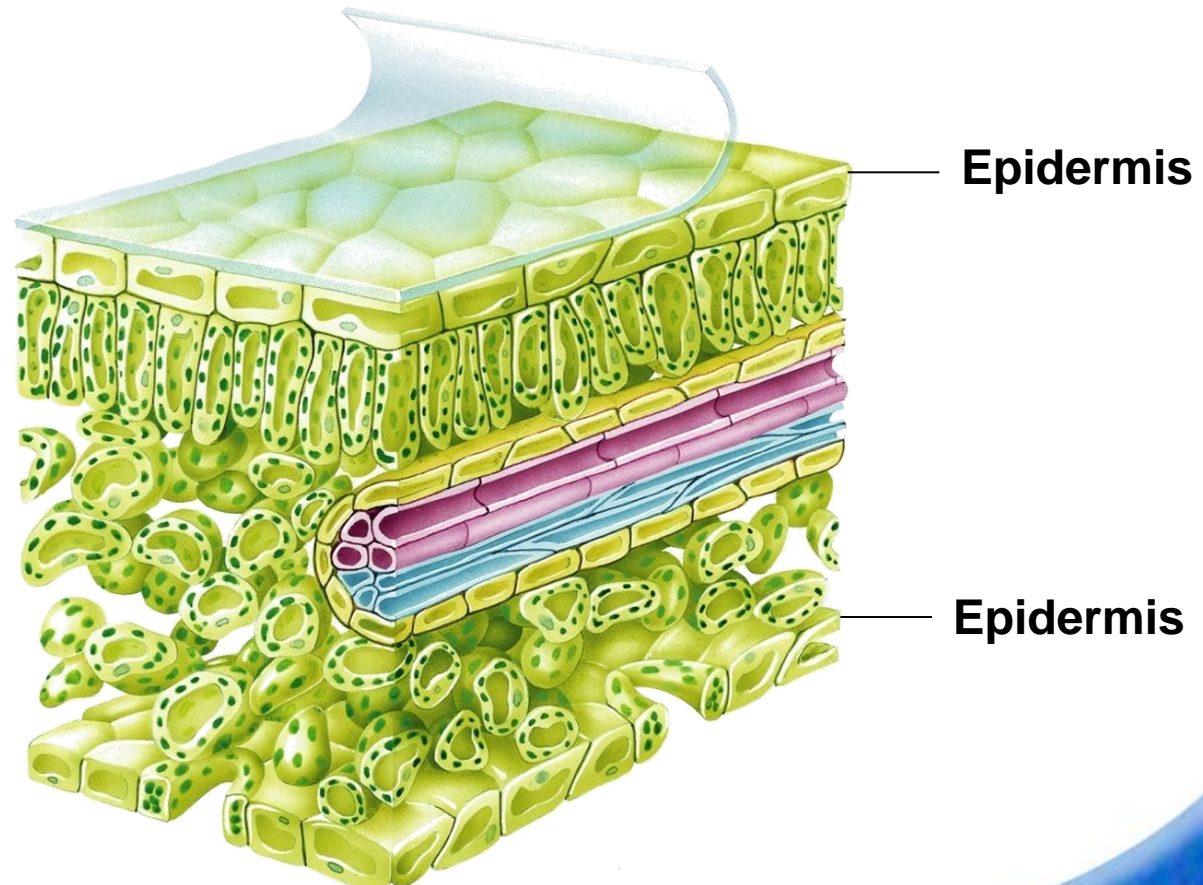
Simple leaves have only one blade and one petiole.



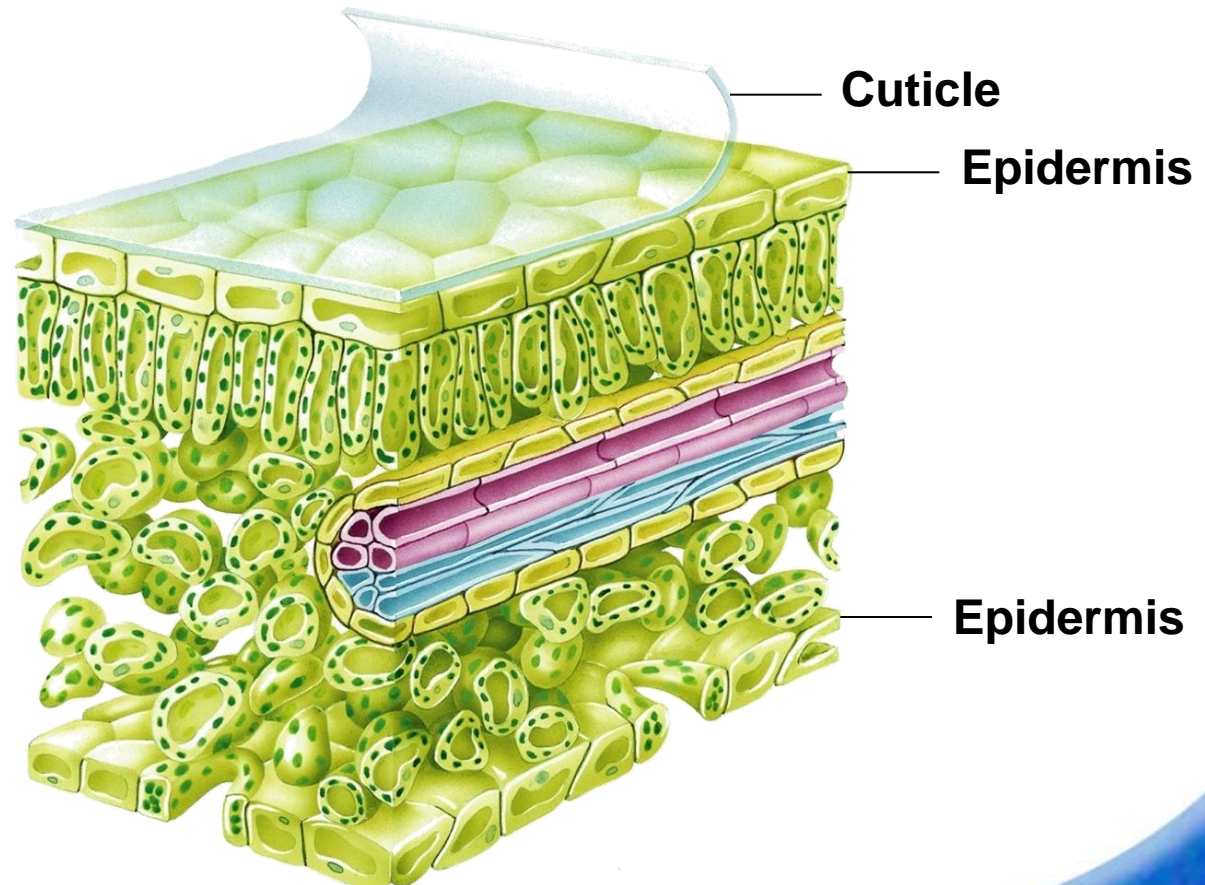
Compound leaves have several blades, or leaflets, that are joined together and to the stem by several petioles.



Leaves are covered on the top and bottom by epidermis.



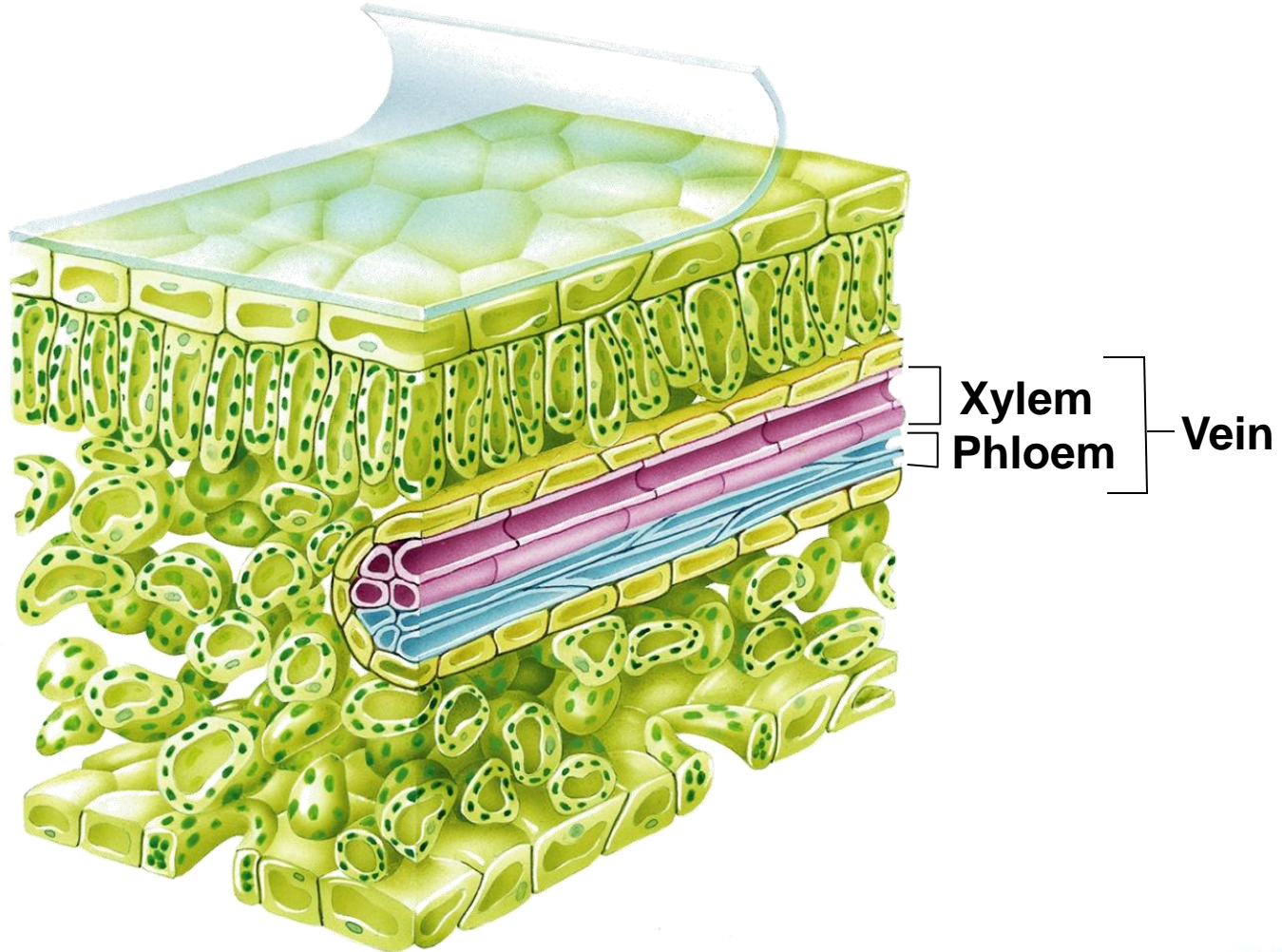
The epidermis of many leaves is covered by the cuticle.



The cuticle and epidermal cells form a waterproof barrier that protects tissues inside the leaf and limits the loss of water through evaporation.

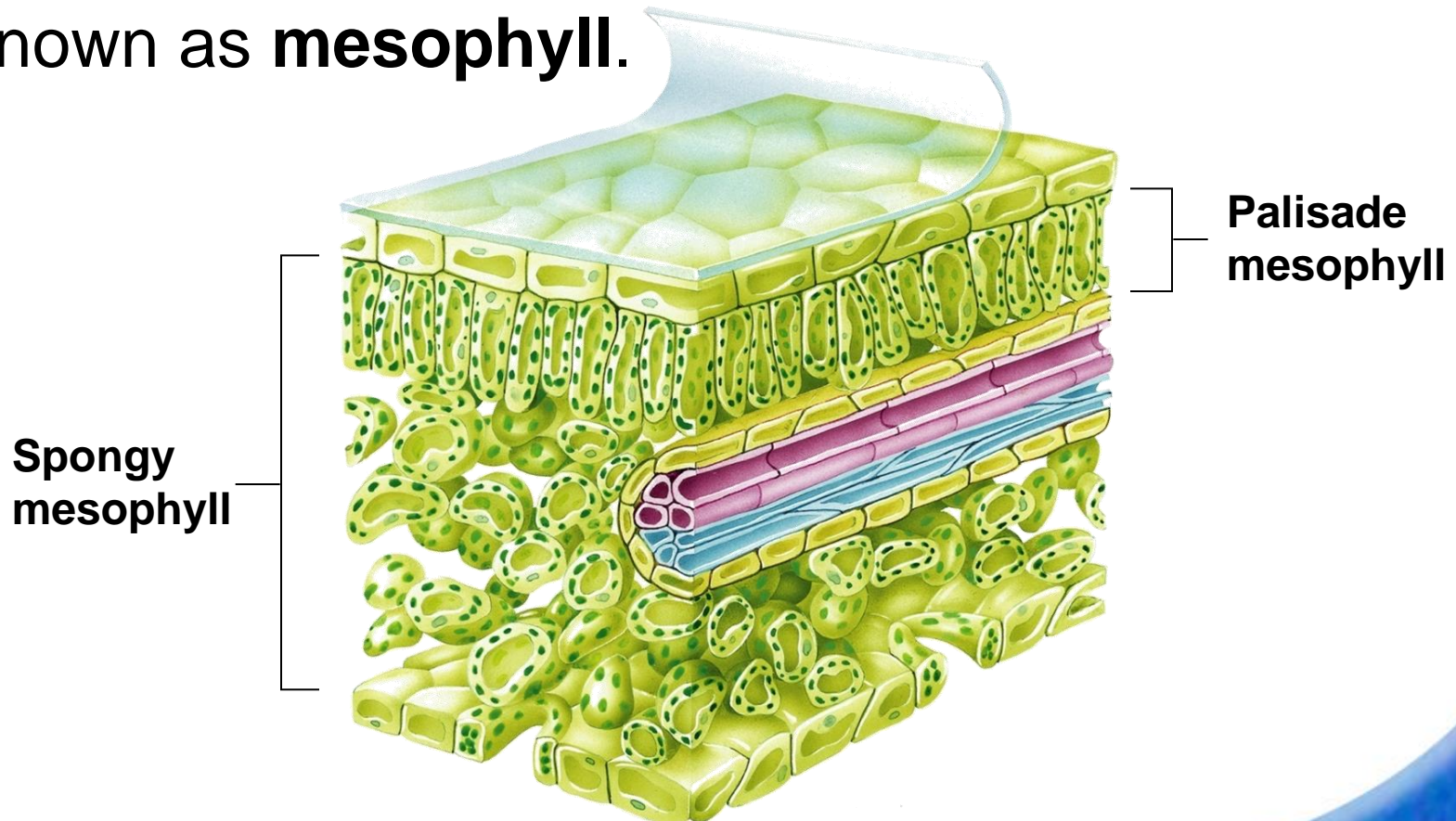
The vascular tissues of leaves are connected directly to the vascular tissues of stems.

All these tissues form the veins of a leaf.

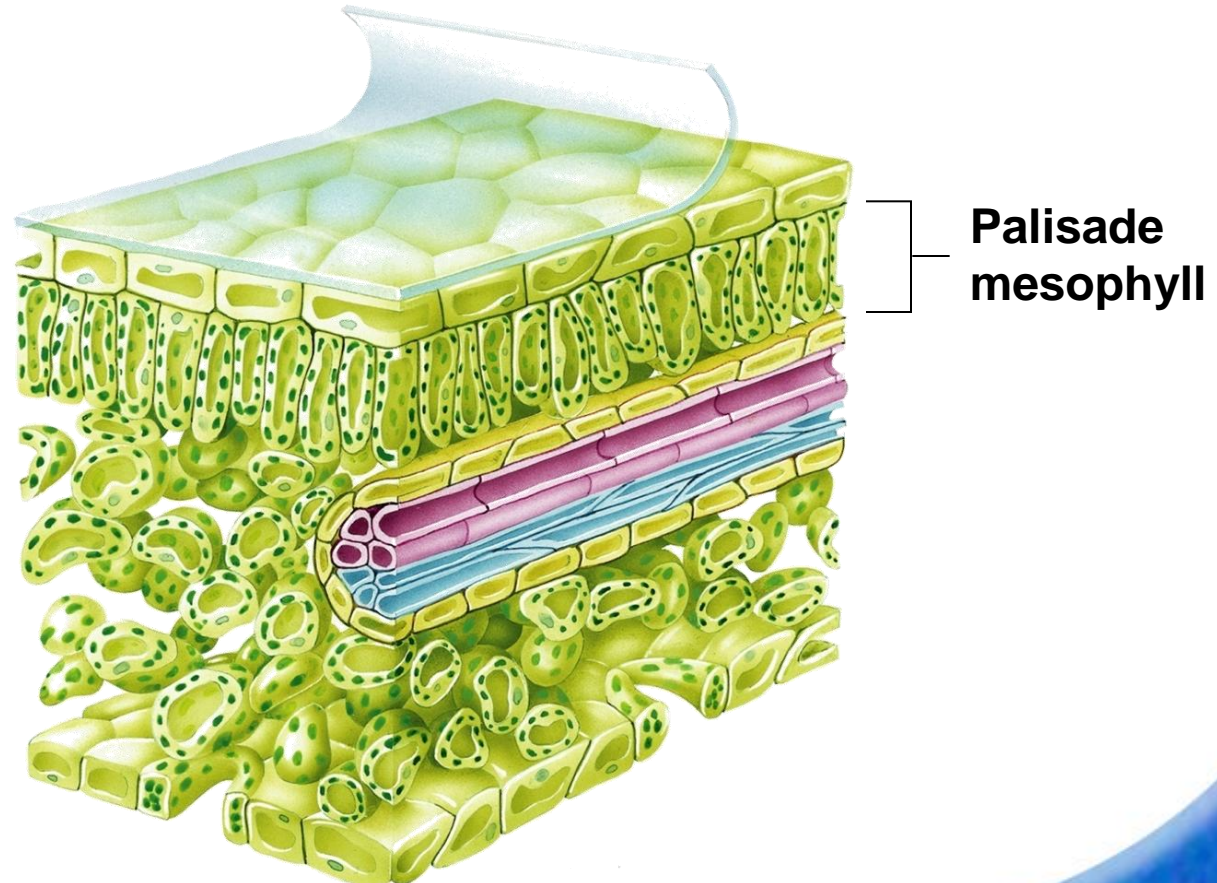


Leaf Functions

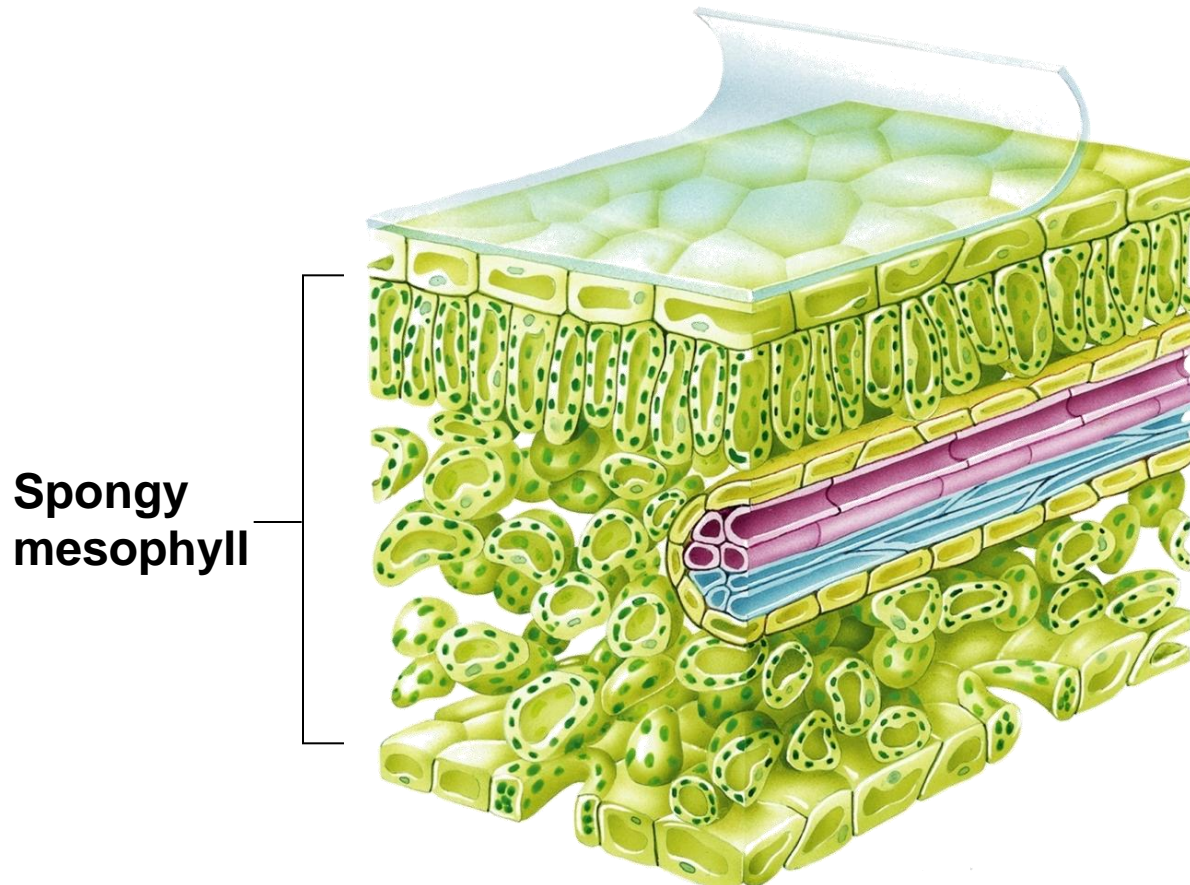
Most leaves consist of a specialized ground tissue known as **mesophyll**.



The layer of mesophyll cells found directly under the epidermis is called the **palisade mesophyll**. These closely-packed cells absorb light that enters the leaf.

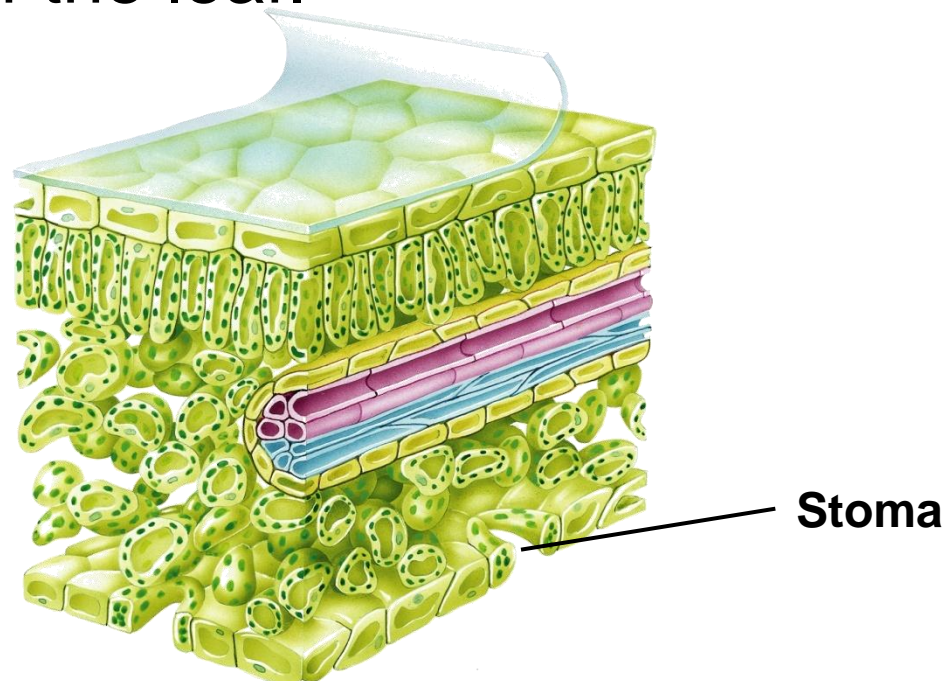


Beneath the palisade mesophyll is the **spongy mesophyll**, a loose tissue with many air spaces between its cells.



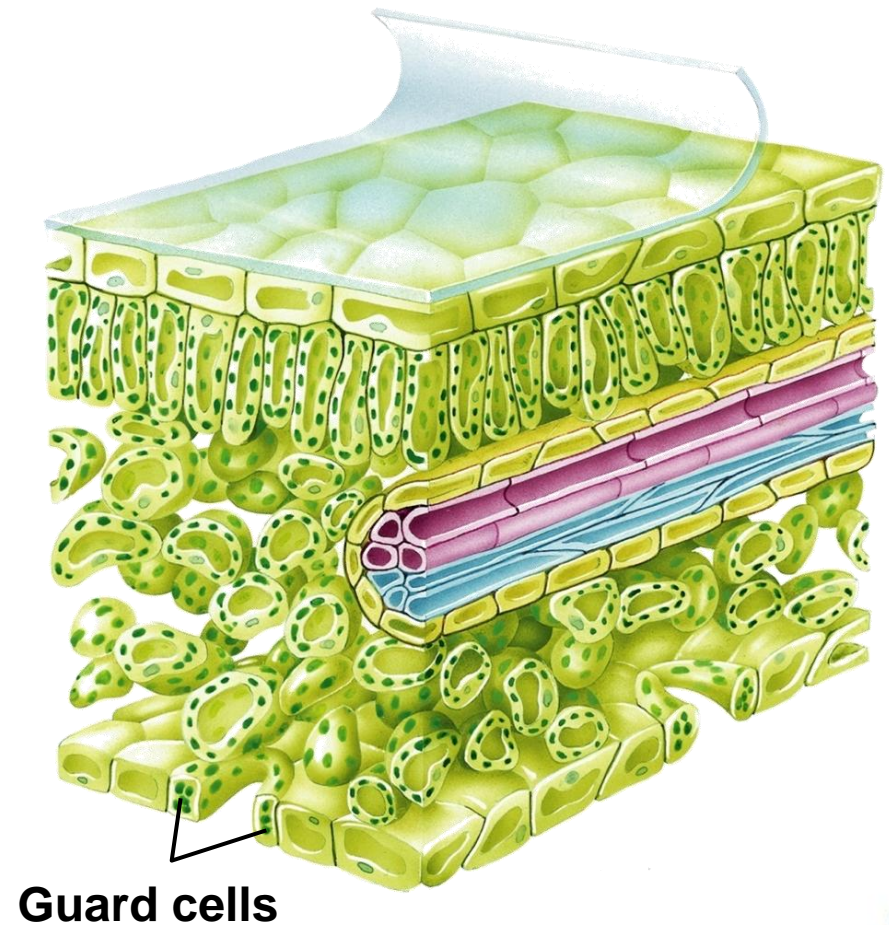
The air spaces connect with the exterior through stomata.

Stomata are porelike openings in the underside of the leaf that allow carbon dioxide and oxygen to diffuse into and out of the leaf.

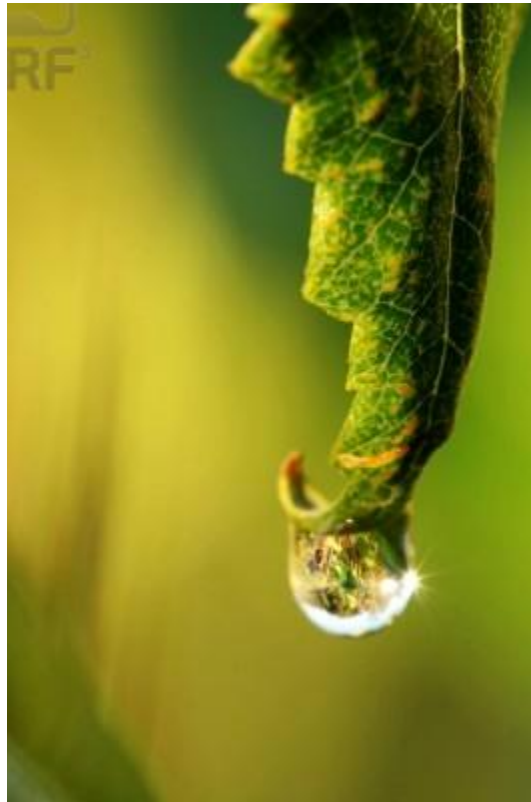


Each stoma consists of two guard cells.

Guard cells are specialized cells that control the opening and closing of stomata by responding to changes in water pressure.



Transpiration is the loss of water through its leaves. This lost water is replaced by water drawn into the leaf through xylem vessels in the vascular tissue.

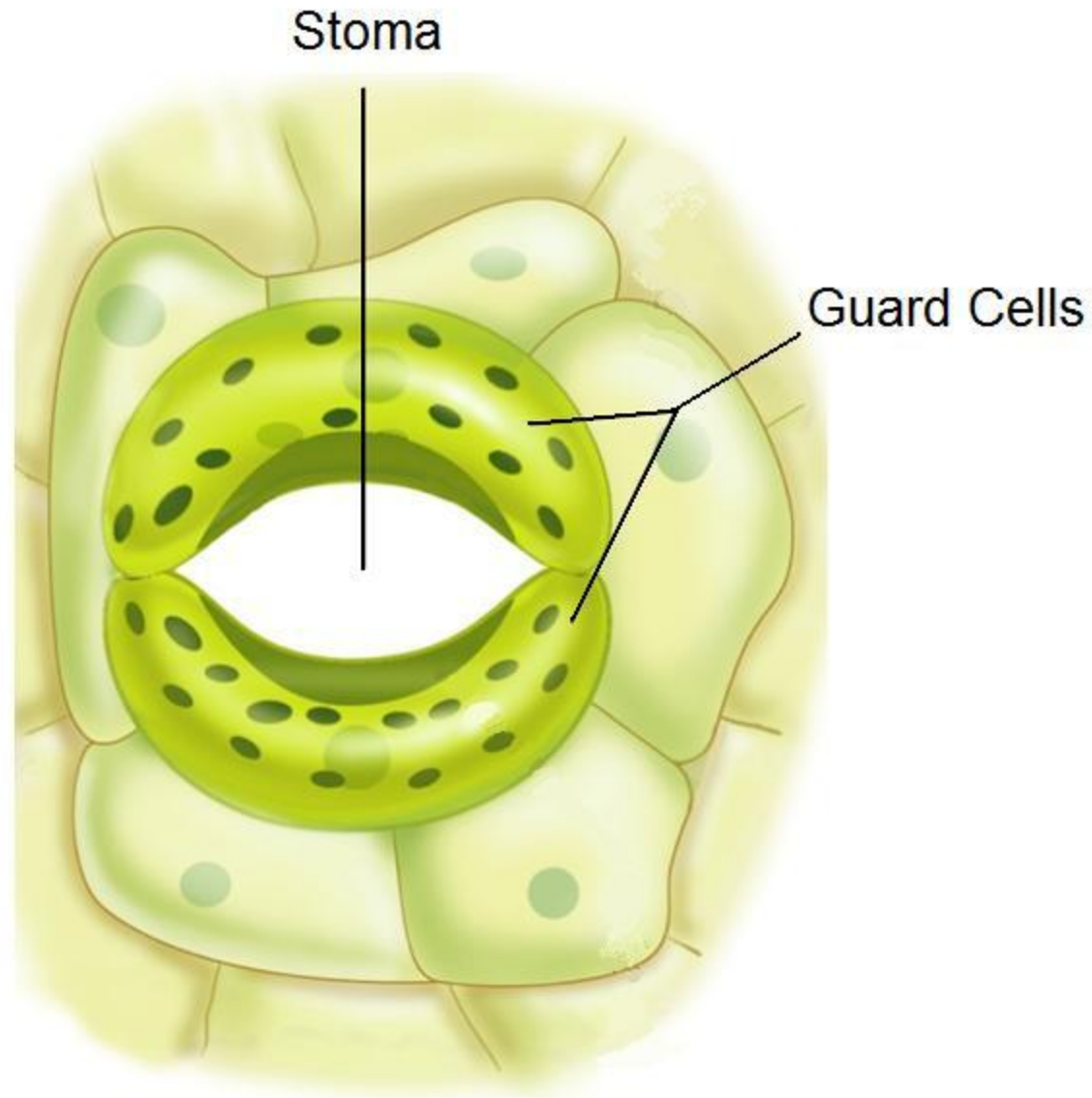


Plant leaves allow gas exchange between air spaces in the spongy mesophyll and the exterior by opening their stomata.



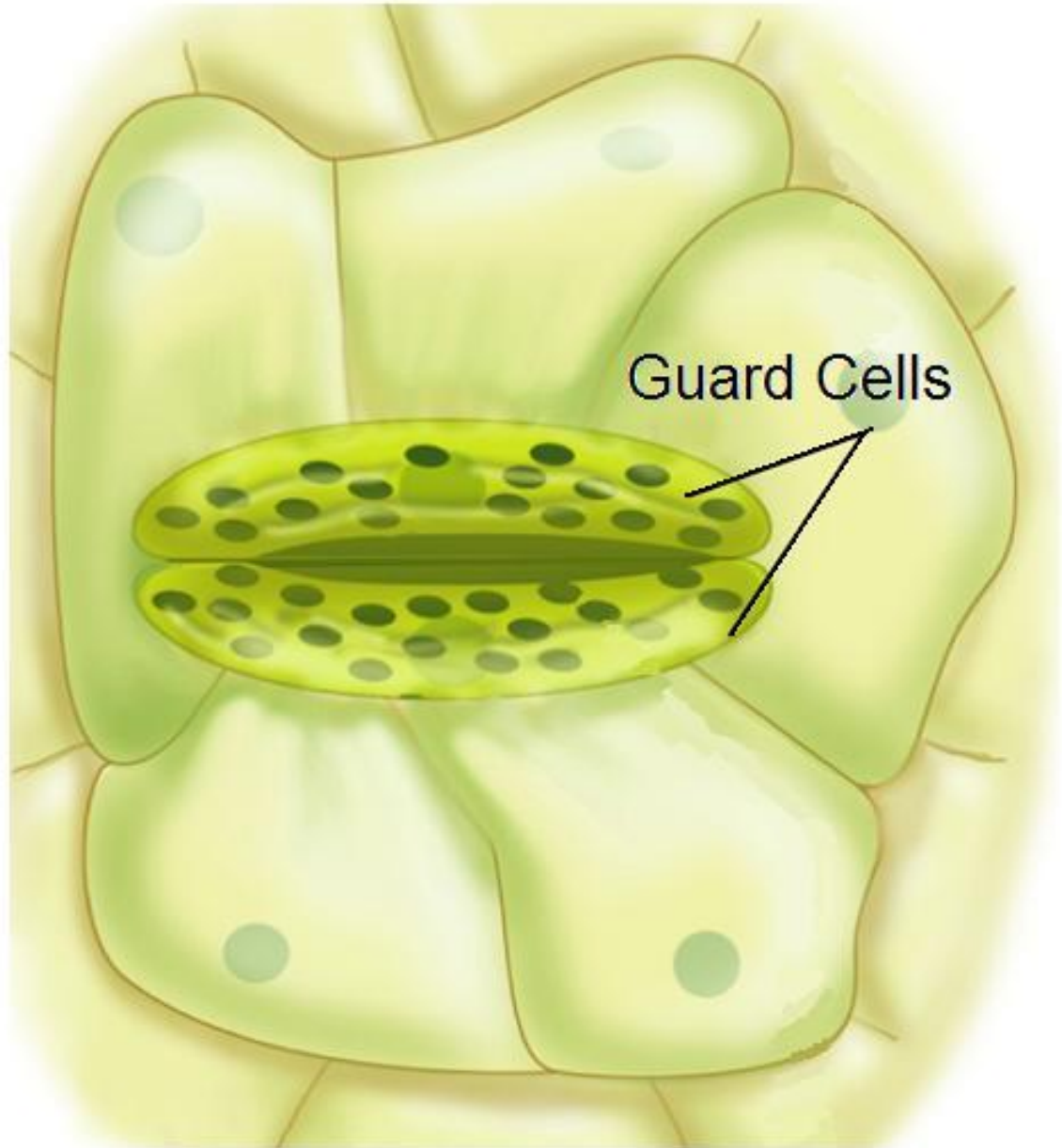
Plants keep their stomata open just enough to allow photosynthesis to take place but not so much that they lose an excessive amount of water.

When water pressure within guard cells is high, the stoma open.



Stoma Open

When water pressure within guard cells decreases, the stoma closes.



Stoma Closed

Plants regulate the opening and closing of their stomata to balance water loss with rates of photosynthesis.

Stomata are open in daytime, when photosynthesis is active, and closed at night, to prevent water loss.

In hot, dry conditions stomata may close even in bright sunlight, to conserve water.

23-4 Section QUIZ

Continue to:

Section QUIZ

- or -

Click to Launch:



1 A compound leaf is one that has

- a. a blade attached by several petioles.
- b. two or more blades.
- c. a blade that is divided into many leaflets.
- d. many blades, each with its own petiole.

2 The layer of cells in a leaf that absorb light is the

a. phloem.

b. vein.

c. palisade mesophyll.

d. epidermis.

3 The structure of a leaf allows it to

- a. maximize sun exposure and maximize water loss.
- b. maximize sun exposure and minimize water loss.
- c. minimize sun exposure and maximize water loss.
- d. minimize sun exposure and minimize water loss.

4

A process in which water is lost through the leaves of a plant is called

- a. transpiration.
- b. photosynthesis.
- c. glycolysis.
- d. cellular respiration.

- 5** Gas exchange in a leaf occurs through the
- a. cuticle.
 - b. epidermis.
 - c. mesophyll.
 - d. stomata.